Profiling of phenolic compounds and their antioxidant and anticancer activity in pandan (Pandanus amaryllifolius Roxb.) extracts from different locations of Malaysia.

Abstract

Background Phytochemicals and antioxidants from plant sources are of increasing interest to consumers because of their roles in the maintenance of human health. Most of the secondary metabolites of herbs are used in a number of pharmaceutical products. Methods Secondary metabolites composition and content of five flavonoids and three phenolic acids were evaluated and determined in Pandanus amaryllifolius extracts from three different locations of Malaysia by RP-HPLC; Total phenolic and total flavonoid content were determined using Folin-Ciocalteau and aluminum chloride colorimetric assay; The antioxidant activity of the extracts was determined by the ferric reducing antioxidant potential (FRAP) assay and 1,1-diphenyl-2-picrylhydrazyl (DPPH) assays. MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) Assay was employed to screen anticancer activity of extracts against MCF-7 cancer cell line. Results Highest value of total flavonoids (TF) and total phenolics (TP) was observed in pandan extract from Bachok locattion (1.87 mg/g DW and 6.72 mg/g DW) followed by Klang (1.32 mg/g DW; 5.07 mg/g DW) and Pontian (1.12 mg/g DW; 4.88 mg/g DW). Rutin just detected from Bachok location with value of 0.082 mg/g DW. High content of epicatechin (0.035 mg/g DW) and naringin (0.325 mg/g DW) were observed from Bachok location while, highest content of catechin (0.613 mg/g DW) and kaempferol (0.278 mg/g DW) was observed in pandan extract from Klang location. The extract of pandan from Bachok exhibited highest value of gallic acid (0.423 mg/g DW) and cinnamic acid (0.084 mg/g DW). Ferrulic acid just detected from pandan extract of Bachok location with concentration of 0.281mg/g DW. Between studied locations Bachok exhibited highest value of DPPH (64.27%) and FRAP (517.2 µm of Fe (II)/g) activity followed by Klang (52.16%; 448.6 µm of Fe (II)/g) and Pontian (50.10%; 314.8 µm of Fe (II)/g). The preliminary screening showed pandan extracts from 3 locations possessed anticancer promoting activity against MCF-7 cell line, with 78.3%, 70.5% and 67.4% inhibition rate, respectively. Maximum MCF-7cell line inhibition was observed in pandan extract from Bachok location. Conclusions The samples collected from the North (Bachok) exhibited the highest TP, TF antioxidant and anticancer activity while those from the Southern portion (Pontian) appeared to have the lowest content of TP, TF and antioxidant activity.

Keyword: Pandanus amaryllifolius; Flavonoids; HPLC; Antioxidant activity; DPPH; FRAP; Anticancer activity; MCF-7.